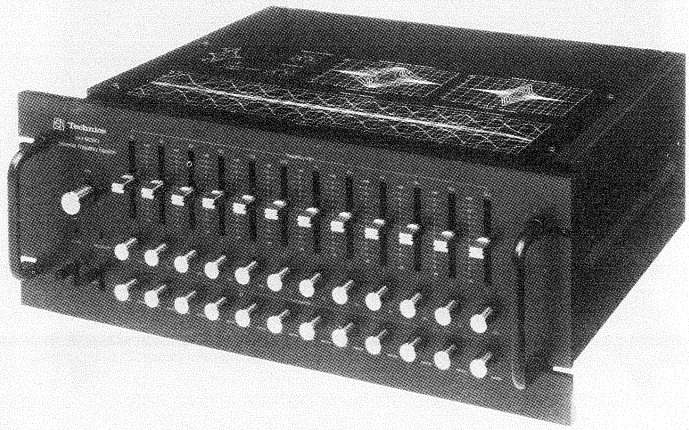
ORDER NO. SD7509-1038

Service Manual

HI-FI COMPONENTS

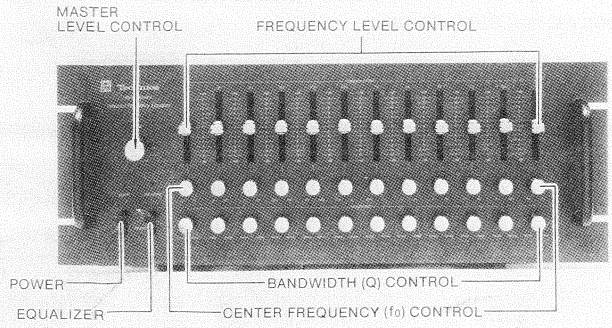
SH-9090-(X)

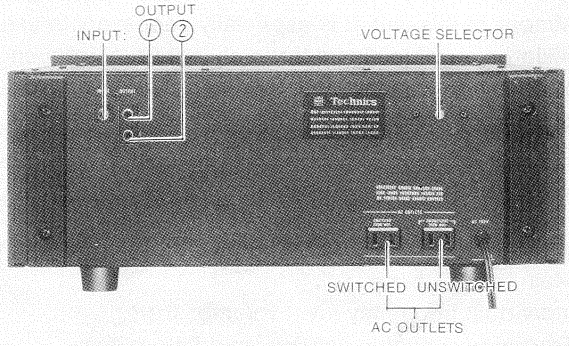


Universal Frequency Equalizer
(monoral)

TECHNICAL SPECIFICATIONS

Output voltage/output impedance	
Rated	1V/500Ω
Maximum	7V/500Ω
Total harmonic distortion	0.05% (rated output)
Input sensitivity/input impedance	1V/50kΩ
Frequency response	10 Hz～30 kHz, +0 dB −0.5 dB
	3 Hz～80 kHz, +0 dB −3 dB
S/N (IHF, A) Signal = 1V	90 dB
Master level controls	+6 dB～−6 dB
Band-level controls	+12 dB～−12 dB (12 divisions)
Center-frequency controls	From 1 octave above to 1 octave below the standard frequency (12 divisions)
Bandwidth controls (Q)	0.7～7 (12 divisions)
Center frequency	10 Hz, 30 Hz, 60 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8kHz, 16 kHz, 32 kHz
Power supply	110V, 120V, 220V, 240V
Power consumption	40W
Dimensions (WxHxD)	450x173x375 mm $17\frac{23}{32}$"x$6\frac{12}{16}$"x$14\frac{3}{4}$"
Weight	9.2 kg 20.3 lb



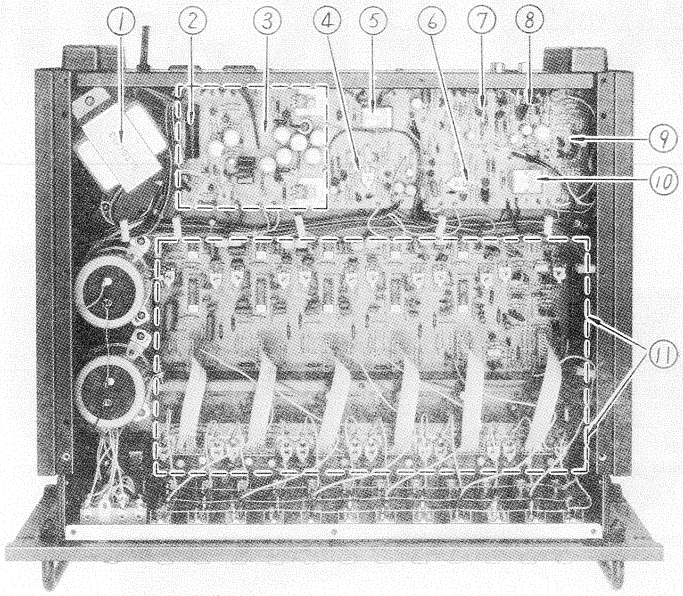


National Technics

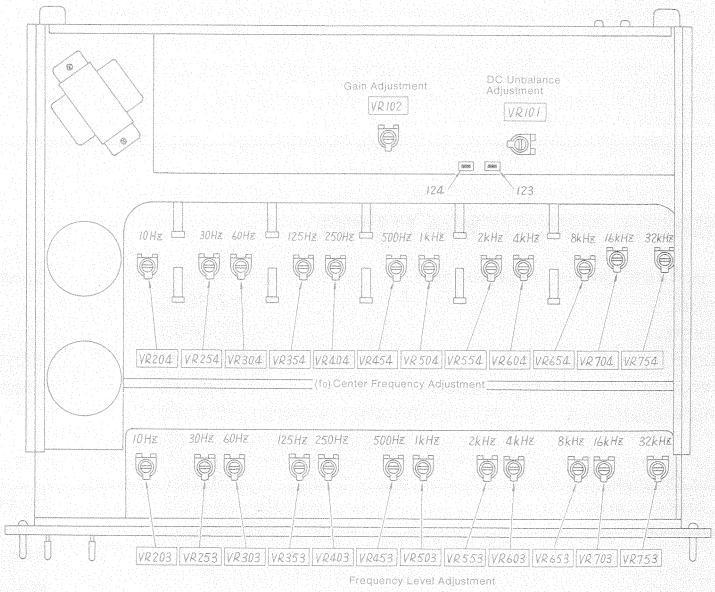
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka, Japan

■ LOCATION OF CIRCUITS

1. POWER TRANSFORMER
2. FUSE
3. POWER SOURCE CIRCUIT
4. AUDIO FREQUENCY AMPLIFIER CIRCUIT
5. RELAY OF MUTING
6. SUBTRACTION AMPLIFIER CIRCUIT
7. ADDITION AMPLIFIER CIRCUIT
8. AUDIO FREQUENCY AMPLIFIER CIRCUIT
9. BUFFER AMPLIFIER
10. RELAY OF EQUALIZER SELECTOR
11. BAND PASS FILTER CIRCUIT

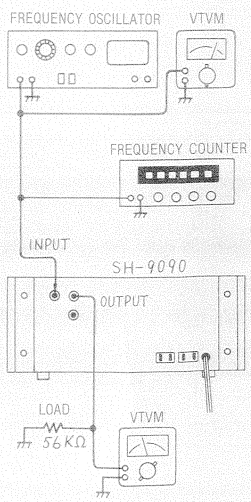


■ ALIGNMENT INSTRUCTIONS


Gain Adjustment
VR102
DC Unbalance Adjustment
VR101
124
123
10Hz 30Hz 60Hz 125Hz 250Hz 500Hz 1kHz 2kHz 4kHz 8kHz 16kHz 32kHz
VR204 VR254 VR304 VR354 VR404 VR454 VR504 VR554 VR604 VR654 VR704 VR754
(fo) Center Frequency Adjustment
10Hz 30Hz 60Hz 125Hz 250Hz 500Hz 1kHz 2kHz 4kHz 8kHz 16kHz 32kHz
VR203 VR253 VR303 VR353 VR403 VR453 VR503 VR553 VR603 VR653 VR703 VR753
Frequency Level Adjustment

Alignment Points
(Fig. 1)

- This unit should be re-adjusted when capacitors or resistors (especially the volume) are replaced.
- A perfectly complete and very precise measuring instrument is required for adjustment of this unit. It is especially necessary to use a frequency oscillator which oscillates a stable signal for each individual frequency.
- For adjustment of this unit, turn the power switch on and the equalizer selector to the "IN" position.
  Note that about 12 seconds are required, after turning the power switch on, for the equalizer circuit to operate.
- Refer to figure 2 for information concerning connections of measuring instruments.
- Follow the steps described below before beginning adjustments.
  * Main level volume...0.
  * Individual frequency level volume...0 dB.
  * Frequency variable volume...middle position.
  * Band-width volume...narrow.
  * Standard input voltage (each frequency)...0 dB in the 1V range (0.775V)



CONNECTIONS OF MEASURING INSTRUMENTS
(Fig. 2)

■ ADJUSTMENT OF THE DC UNBALANCED VOLTAGE

1. Connect a DC voltmeter between terminal [123] and terminal [124] of the P base (with no input power applied)
2. Adjust VR101 to obtain 9 mV.

■ ADJUSTMENT OF TOTAL GAIN (AMPLIFIER GAIN)

① Adjust VR102 so as to standardize the output voltage at any position of the equalizer selector, applying 1 kHz standard input voltage (0.775V) and switching the equalizer selector to "in" and "out" alternately.

■ ADJUSTMENT OF INDIVIDUAL FREQUENCY GAIN

- Adjustment of 1 kHz gain.

Input frequency	Output voltage	Adjustment point	Adjustment summary
1 kHz	1V range 0dB	input level	(1) Vary input level to make output power 0dB (0.775V) in the 1V range at 1 kHz input.
	Maximum	VR504	(2) Set the 1 kHz level volume to +12dB and adjust VR504 to obtain maximum output.
	+12dB	VR503	(3) Adjust VR503 to +12dB of output at this time.

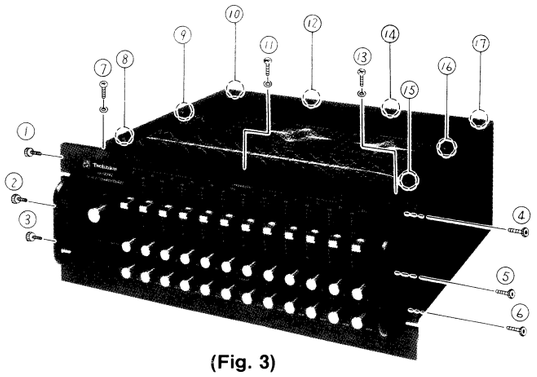
* Concerning other frequencies, adjust them by using the same method as described in "Adjustment of 1 kHz gain."

Frequency	10Hz	30Hz	60Hz	125Hz	250Hz	500Hz	2kHz	4kHz	8kHz	16kHz	32kHz
Maximum output	VR204	VR254	VR304	VR354	VR404	VR454	VR554	VR604	VR654	VR704	VR754
Output (+12dB)	VR203	VR253	VR303	VR353	VR403	VR453	VR553	VR603	VR653	VR703	VR753

■ REMOVAL OF FRONT PANEL & TOP BOARD

1. Pull off each volume control knob.
2. Pull off the power switch and the equalizer selector.
3. Remove the 6 panel-installation bolts from the sides of the panel (M4 bolts ① ~ ⑥), using a hexagonal spanner with 3-mm outer contact surfaces (Ref. to Fig. 3).
4. Remove the panel by holding its handle and pulling the panel gently forward.
5. To remove the top board, remove the eleven screws (nos. ⑦ ~ ⑰ in Fig. 3).

(Note) Care should be taken not to scratch the panel nor deform the volume shafts when removing the knobs.

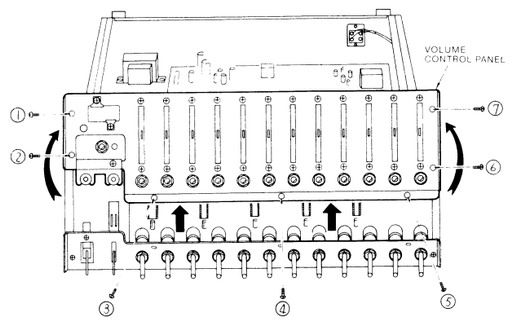


(Fig. 3)

■ HOW TO REMOVE THE VOLUME CONTROL PANEL

1. Remove the front panel.
2. Remove the seven installation screws (① ~ ⑦ in figure 4) for the volume control panel.
3. The volume control panel can then be removed in the direction of the arrow in figure 4.
4. When re-installing the panel, made sure that the 8-pin connector and the earth wire remain in their original condition. Note that, if those parts are not as they were, there is the possibility that incorrect operation or abnormal sounds may result.
5. When replacing the center-frequency variable volume controls with new ones, remove the nut for every volume control and remove the P base from the volume control panel. Then, replace the malfunctioning volume control (s).

Note: After adjustments and/or repairs are finished, make sure that the wiring inside the chassis remains in the original condition. If the earth wire, for example, is not correctly arranged in the specific position it was initially, a malfunction may result.



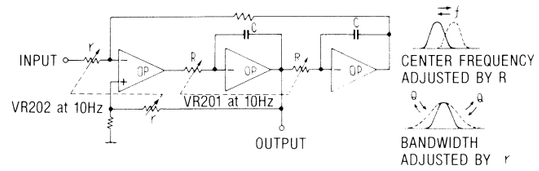
(Fig. 4)

■ SERVICE AID

On this unit, the audio frequency band is divided into 12 bands, and all bands employ equalizers which consist of only capacitors and resistors. The center frequency of each band is continuously variable up to 1 octave above and below. In addition, the "Q" of the resonance peak is also continuously variable from 0.7 through 7, and, because the level variation characteristic of the peak and dip is the same as that when "Q" is approximately constant, minute corrections of the frequency response of the peak and dip are possible.
The equalizer section of this unit is mainly divided into two parts: the band-pass filter section and the operational section.

1. Band-Pass Filter Section

There are 12 band-pass filters, each filter consisting of three operational amplifiers (OP amplifier) (figure 5). The three operational amplifiers are: two integrators and one adder.
Because the center frequency of the band-pass filter is determined by the time constant relative to **R** and **C**, it is operated by a 2-gang volume control (VR201 at 10Hz in the circuit diagram). In addition, the "Q" of the resonance peak characteristic (bandwidth) of the band-pass filter is to be varied with the 2-gang volume "**r**" (VR202 at 10Hz in the circuit diagram).



(Fig. 5)

2. Operational Section

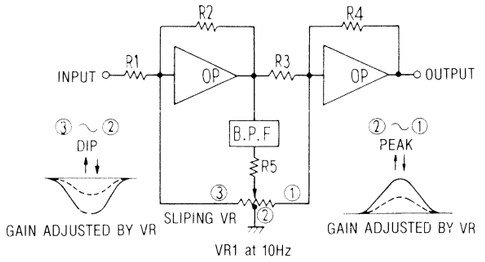
This "block" functions to form the peak and dip frequency response; figure 6 shows this circuit construction. When the level volume VR (VR1 at 10Hz in the circuit diagram) is located at the center position, the band-pass filter is disengaged from the circuit, so that the gain of both input and output is:

$$G = \frac{R_2}{R_1} \times \frac{R_4}{R_3}$$

When the sliding VR is located at position ①, the output becomes the total of the input from R_3 added to the output of the band-pass filter.

That is, $G = \frac{R_2}{R_1} \times \left(\frac{R_4}{R_3} + \frac{R_4}{R_5} T_B\right)$

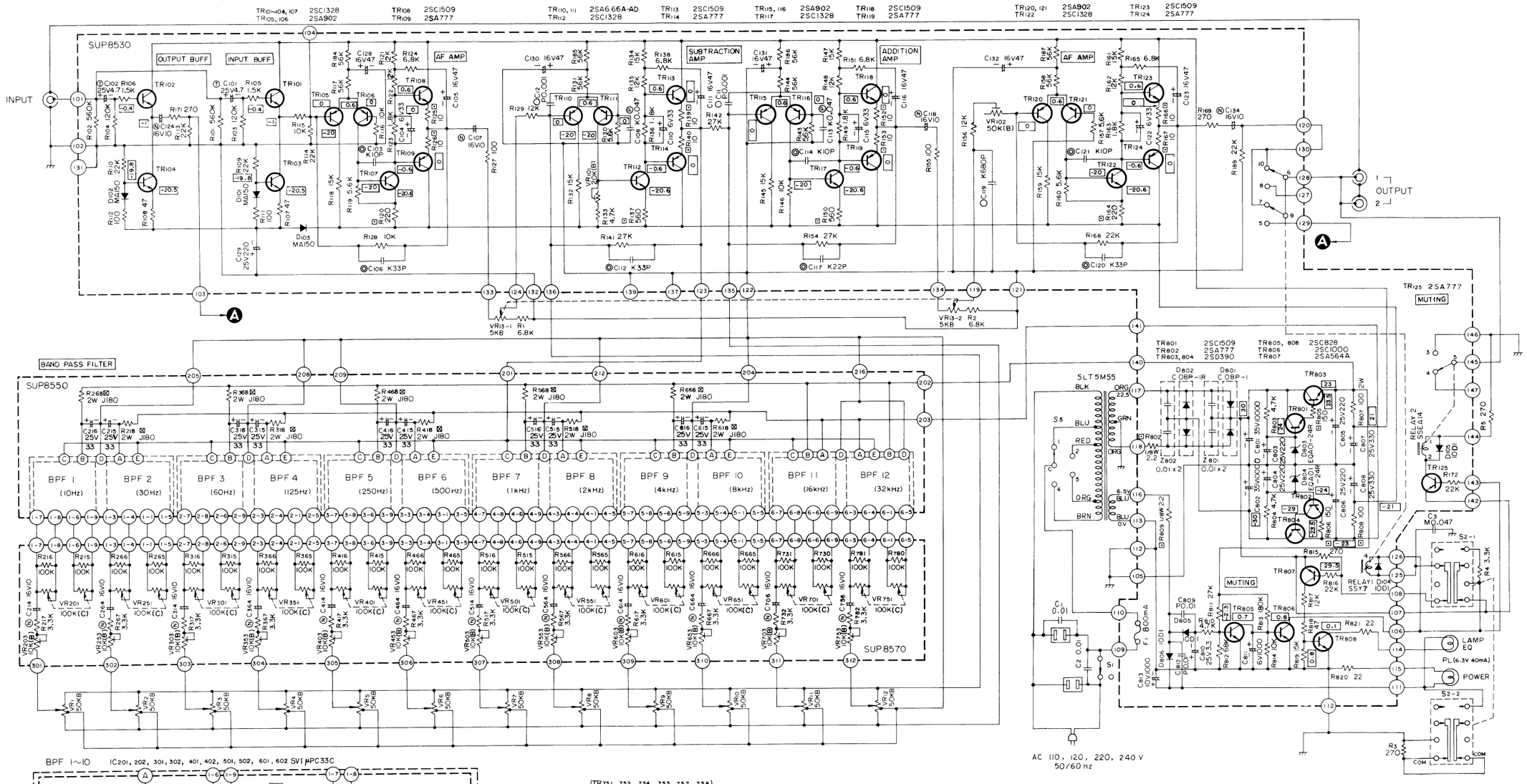
T_B: gain characteristic of the band-pass filter.

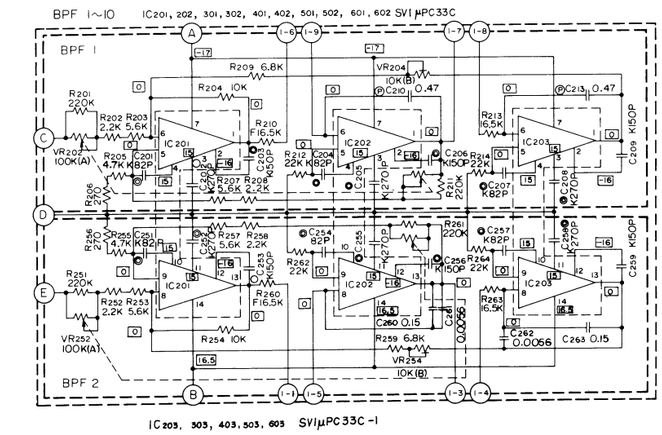


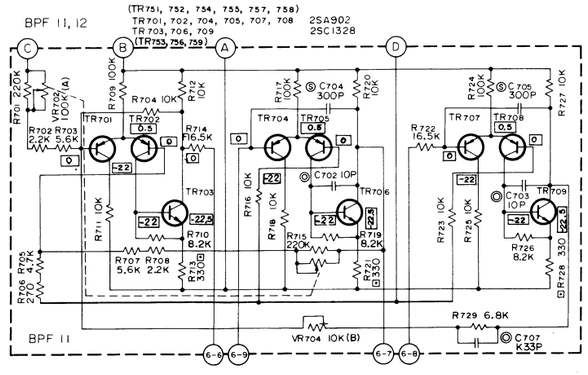
(Fig. 6)

In this way, as the overall response, a frequency response which has a peak is produced.
When the sliding VR is located at position ③, the band-pass filter enters the NF circuit of the first-stage amplifier so that negative feedback, which is the synthesis of a band-pass filter which has a peak and of R_2, will be applied. The result is a frequency response which has a dip.
There are 12 band-pass filters and sliding volume controls in parallel, making it possible to form the desired frequency response for each frequency.

Schematic Diagram.....Model SH-9090 (This schematic diagram may be modified at any time with the development of new technology.)





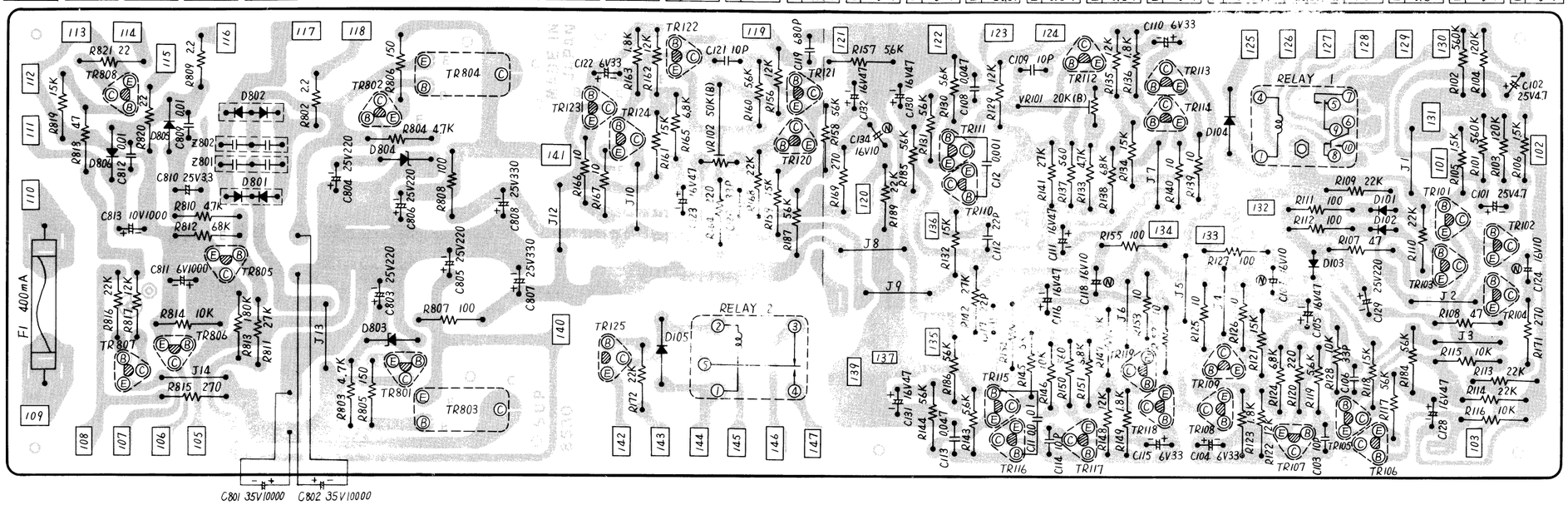


(Notes)

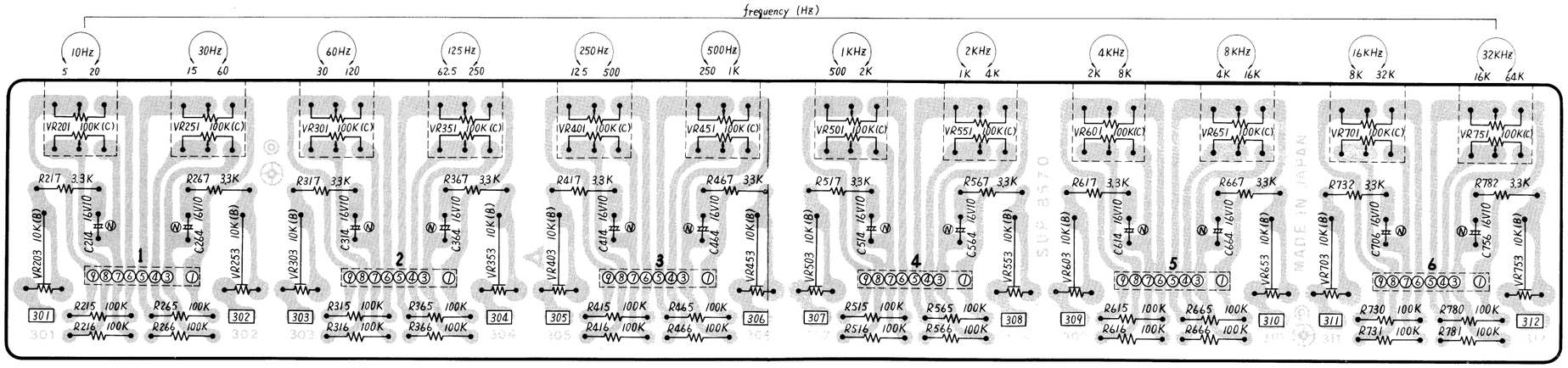
1. Refer to the section "Explanation of the schematic diagram" on page 10 before studying the schematic diagram itself.
2. **S1:** Power source switch. Shown in the **"ON"** position.
3. **S2-1, S2-2:** Equalizer selector switch. Shown in the **"IN"** position.
   IN ↔ OUT
4. **S3:** Voltage selector switch. Shown in the "110V" position.
   110V ↔ 120V ↔ 220V ↔ 240V.
5. **Relay 1:** Equalizer selector relay (operated by S2).
6. **Relay 2:** Muting relay (output is shorted when power turned on or off).
7. VR13-1, VR13-2: Master level volume.
8. VR101: Semi-fixed volume for adjustments of DC unbalance.
9. VR102: Semi-fixed volume for adjustment of total gain (amplifier gain).
10. Refer to page 10 (table 2) for operation of other volumes.
11. Values within ▭ are standard DC voltages of this unit measured by DC valve voltmeter with the chassis as standard reference.

POWER SOURCE, MUTING, BUFFER AMP, AF AMP, ADDITION & SUBTRACTION AMP CIRCUIT BOARD

TR808	TR807	TR806	TR805	TR804	TR803	TR802	TR801	TR125	TR124	TR123	TR122	TR121	TR120	TR119	TR118	TR117	TR116	TR115	TR114	TR113	TR112	TR111	TR110	TR109	TR108	TR101
C 0.1V	C 29 V	C 0 V	C 0.7 V	C -23 V	C 30 V	C -29.5V	C 30 V	C 0 V	C -21 V	C 21 V	C -0.6V	C -20 V	C -20 V	C -21 V	C 21 V	C -0.6 V	C -20 V	C -20 V	C -21 V	C -20 V	C -20 V	C -20 V	C -20 V	C -21 V	C 21 V	C 21 V
B 0.8 V	B 29.5V	B 0.8 V	B -2.3 V	B -29.5V	B 23.5V	B -24 V	B 24 V	B 29.4V	B -0.6 V	B 0.6 V	B -20 V	B 0 V	B 0.6 V	B -0.6 V	B 0.6 V	B -20 V	B 0 V	B 0 V	B -0.6 V	B 0 V	B 0 V	B 0.6 V	B 0 V	B -0.6 V	B 0.6 V	B -0.4 V
E 0 V	E 30 V	E 0 V	E 0 V	E -30 V	E 23 V	E -23.5V	E 23.5V	E 30 V	E 0 V	E 0 V	E -20.6	E 0.6 V	E 0.6 V	E 0 V	E 0 V	E -20.6	E 0.6 V	E 0.6 V	E 0 V	E 0.6 V	E 0.6 V	E 0.6 V	E 0.6 V	E 0 V	E 0 V	E -1 V



CENTER FREQUENCY & FREQUENCY GAIN CONTROL CIRCUIT BOARD



BAND PASS FILTER CIRCUIT BOARD (BPF 1 ~ BPF 12)

IC201~203, 301~303, 401~403, 501~503, 601~603

1	0 V	5	0 V	9	0 V	13	0 V
2	-16 V	6	0 V	10	+15 V	14	+16.5 V
3	+15 V	7	-17 V	11	+15 V		
4	+15 V	8	0 V	12	-16 V		

TR701, 704, 707, 751, 754, 757

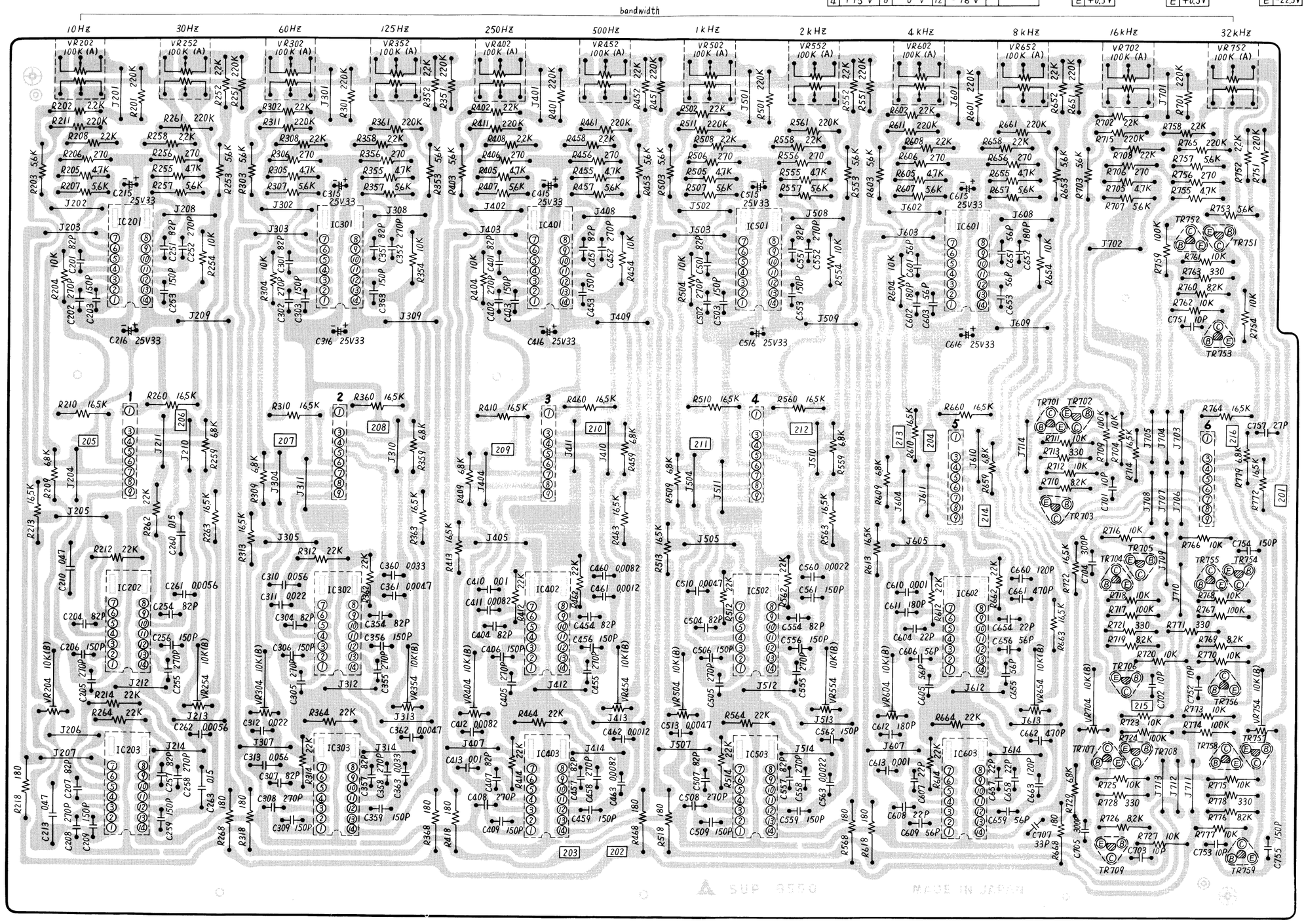
C	-22 V
B	0 V
E	+0.5 V

TR702, 705, 708, 752, 755, 758

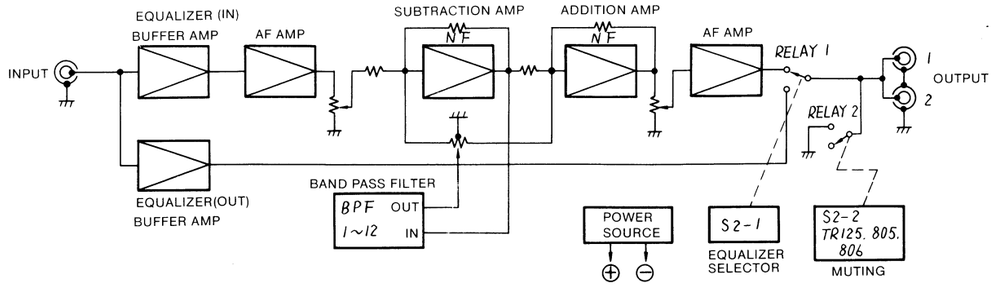
C	-22 V
B	0 V
E	+0.5 V

TR703, 706, 709, 753, 756, 759

C	0 V
B	-22 V
E	-22.5 V



■ BLOCK DIAGRAM



■ EXPLANATION OF THE SCHEMATIC DIAGRAM

- This schematic diagram includes only band-pass filters BPF 1, BPF 2 and BPF 11. Other band-pass filters are omitted because band-pass filters BPF 3, 5, 7 and 9 are very similar to BPF 1; BPF 4, 6, 8 and 10 are very similar to BPF 2; and BPF 12 is very similar to BPF 11. Note, however, that the numbers of capacitors and resistors are different at the P base, and that the constant of some of the capacitors and resistors is different. These differances are shown, therefore, in the table at the right.

  * BPF 1 is numbered from 201, and BPF 2 from 251.
  * C310 of BPF 3 corresponds to C210 of BPF 1.

- Each frequency and its adjustment volume is shown in the table 2.

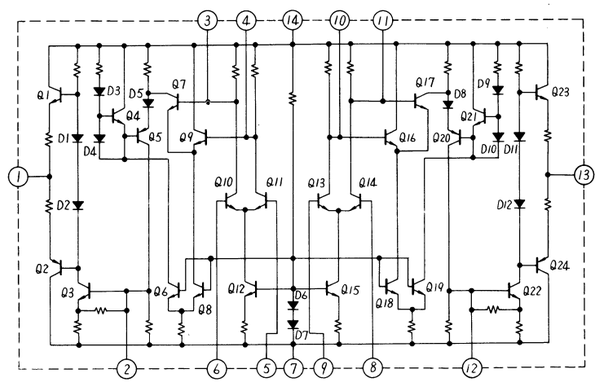
	C R No.	CENTER FREQUENCY	REMARKS
BPF 1	C201~ R201~	10Hz	C210, 213 0.47μF Ⓟ J
BPF 2	C251~ R251~	30Hz	C260, 263 0.15 Ⓟ J C261, 262 0.0056 Ⓟ J
BPF 3	C301~ R301~	60Hz	C310, 313 0.056 Ⓟ J C311, 312 0.022 Ⓟ J
BPF 4	C351~ R351~	125Hz	C360, 363 0.033 Ⓟ J C361, 362 0.0047 Ⓟ
BPF 5	C401~ R401~	250Hz	C410, 413 0.01 Ⓟ J C411, 412 0.0082 Ⓟ J
BPF 6	C451~ R451~	500Hz	C460, 463 0.0082 Ⓟ J C461, 462 0.0012 Ⓟ J
BPF 7	C501~ R501~	1kHz	C510, 513 0.0047 Ⓟ J
BPF 8	C551~ R551~	2kHz	C560, 563 0.0022 Ⓟ J C561, 562 150P Ⓢ J
BPF 9	C601~ R601~	4kHz	C610, 613 0.001 Ⓟ J C611, 612 180P Ⓢ J C603, 605 56P Ⓞ K 606,609 C602 180P Ⓞ K C604,607,608,601 22P Ⓞ K
BPF 10	C651~ R651~	8kHz	C660, 663 120P Ⓢ J C661, 662 470P Ⓢ J C653, 655 56P Ⓞ K 656,659 C654,657,658, 651 22P Ⓞ J C652 180P Ⓞ K
BPF 11	C701~ R701~	16kHz	C704, 705 330P Ⓢ J C707 33P K
BPF 12	C751~	32kHz	C754, 755 150P Ⓢ J C757 27P Ⓞ K

[**TABLE 1**] →

[**TABLE 2**] ↓

	10Hz	30Hz	60Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz	32kHz
LEVEL	VR1	VR2	VR3	VR4	VR5	VR6	VR7	VR8	VR9	VR10	VR11	VR12
FREQUENCY	VR201	VR251	VR301	VR351	VR401	VR451	VR501	VR551	VR601	VR651	VR701	VR751
BANDWIDTH	VR202	VR252	VR302	VR352	VR402	VR452	VR502	VR552	VR602	VR652	VR702	VR752
GAIN ADJUST	VR203	VR253	VR303	VR353	VR403	VR453	VR503	VR553	VR603	VR653	VR703	VR753
FREQ ADJUST	VR204	VR254	VR304	VR354	VR404	VR454	VR504	VR554	VR604	VR654	VR704	VR754

[**Equivalent circuit of SVIμPC 33C**] →



■ REPLACEMENT PARTS LIST

NOTES
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. **SAFETY** Indicates that only parts specified by the manufacturer be used for replacement in critical circuits.

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
INTEGRATED CIRCUIT				
IC201,202, 301,302, 401,402, 501,502, 601,602	SVIAUPC33C	Band Pass Filter	10	
IC203,303, 403,503, 603	SVIAUPC33C-1	Band Pass Filter	5	
TRANSISTORS				
TR101~104, 107,112, 117,122, 703,706, 709, 753, 756,759	2SC1328-T	Equalizer Buffer Amp., AF Amp. & Band Pass Filter	14	
TR105,106, 115,116, 120,121, 701,702, 704,705, 707,708, 751,752, 754,755, 757,758	2SA902-F	Differential Amplifier [Use in Rank Pairs] There are 2 ranks (F and G)	18	
TR108,113 118,123, 801	2SC1509-Q	AF Amplifier } Use in Pairs	5	
TR109,114, 119,124, 125,802	2SA777-Q	AF Amp & Relay Driver } Use in Pairs	6	
TR110,111,	2SA666A-AD1~ ~2SA666A-AD5	Differential Amplifier [There are 5 ranks, Use in pairs]	2	
TR803,804	2SD390-Q	DC Voltage Control	2	
TR805,808	2SC828-R	Muting Switching	2	
TR806	2SC1000-BL	Muting Relay Switching	1	○
TR807	2SA564A-R	Equalizer Indicator Switching	1	
DIODES				
D101,102,103	MA150	Thermo Compensation & Noise Silencer	3	
D801	SVDAC08P-1	Rectifier	1	
D802	SVDAC08P-1R	Rectifier	1	
D803,804	SVDEQA0124R	Voltage Regulator, 24V Zener	2	
D104,105,805, 806	SVDA10D1M	Transistor Protection & Rectifier	4	
TRANSFORMER				
	SLT5M55	Power Transformer	1	○ SAFETY
RESISTORS				
R820,821	ERD14TJ220	22Ω, 1/4W, ±5%, Carbon	2	
R107,108,818	ERD14TJ470	47Ω, 1/4W, ±5%, Carbon	3	
R111,112,127, 155	ERD14TJ101	100Ω, 1/4W, ±5%, Carbon	4	
R5,169,271, 206,256,306, 356,406,456, 506,556,606, 656,706,756, 815	ERD14TJ271	270Ω, 1/4W, ±5%, Carbon	16	
R105,106	ERD14TJ152	1.5kΩ, 1/4W, ±5%, Carbon	2	
R123,136,149, 163	ERD14TJ182	1.8kΩ, 1/4W, ±5%, Carbon	4	
R171,202,208, 252,258,302, 352,358,402, 408,452,458, 502,508,552, 558,602,608, 652,658,702, 708,752,758	ERD14TJ222	2.2kΩ, 1/4W, ±5%, Carbon	24	
R4,217,267, 317,367,417, 467,517,567, 617,667,732, 782	ERD14TJ332	3.3kΩ, 1/4W, ±5%, Carbon	13	
R133,205,255, 305,355,405, 455,505,555, 605,655,705, 755,803,804, 810	ERD14TJ472	4.7kΩ, 1/4W, ±5%, Carbon	16	
R119,130,143, 157,160,203, 207,253,257, 303,307,353, 357,403,407, 453,457,503, 507,553,557, 603,607,653, 657,703,707, 753,757	ERD14TJ562	5.6kΩ, 1/4W, ±5%, Carbon	29	
R1,2,124 138,151,165, 209,259,309, 359,409,459, 509,559,609, 659,729,779	ERD14TJ682	6.8kΩ, 1/4W, ±5%, Carbon	18	
R710,719,726 760,769,776	ERD14TJ822	8.2kΩ, 1/4W, ±5%, Carbon	6	
R115,116,128, 146,204,254, 304,354,404, 454,504,554, 604,654,704, 711,712,716, 718,720,723, 725,727,754, 761,762,766, 768,770,773, 775,777,814	ERD14TJ103	10kΩ, 1/4W, ±5%, Carbon	33	
R122,129,135, 148,156,162, 817	ERD14TJ123	12kΩ, 1/4W, ±5%, Carbon	7	
R118,121,132, 134,145,147, 159,161,819	ERD14TJ153	15kΩ, 1/4W, ±5%, Carbon	9	
R109,110,114, 168,172,189, 212,214,262, 264,312,314, 362,364,412, 414,462,464, 512,514,562, 564,612,614, 662,664,816,	ERD14TJ223	22kΩ, 1/4W, ±5%, Carbon	27	
R141,142,154, 811	ERD14TJ273	27kΩ, 1/4W, ±5%, Carbon	4	
R168	ERD14TJ333	33kΩ, 1/4W, ±5%, Carbon	1	
R113,117,131, 144,158,184, 185,186,187	ERD14TJ563	56kΩ, 1/4W, ±5%, Carbon	9	
R812	ERD14TJ683	68kΩ, 1/4W, ±5%, Carbon	1	
R215,216,265, 266,315,316, 365,366,415, 416,465,466, 515,516,565, 566,615,616, 665,666,709, 717,724,730, 731,759,767, 774,780,781	ERD14TJ104	100kΩ, 1/4W, ±5%, Carbon	30	
R103,104	ERD14TJ124	120kΩ, 1/4W, ±5%, Carbon	2	
R813	ERD14TJ184	180kΩ, 1/4W, ±5%, Carbon	1	
R201,211,251, 261,301,311, 351,361,401, 411,451,461, 501,511,551, 561,601,611, 651,661,701, 715,751,765	ERD14TJ224	220kΩ, 1/4W, ±5%, Carbon	24	
R101,102	ERD14TJ564	560kΩ, 1/4W, ±5% Carbon	2	
R125,126,139, 140,152,153 166,167	ERD14FJ100	10Ω, 1/4W, ±5%, Carbon	8	SAFETY
R808	ERD14FJ101	100Ω, 1/4W, ±5%, Carbon	1	SAFETY
R805,806	ERD14FJ151	150Ω, 1/4W, ±5%, Carbon	2	SAFETY
R120,164	ERD14FJ221	220Ω, 1/4W, ±5%, Carbon	2	SAFETY
R713,721,728, 763,771,778	ERD14FJ331	330Ω, 1/4W, ±5%, Carbon	6	SAFETY
R137,150	ERD14FJ561	560Ω, 1/4W, ±5%, Carbon	2	SAFETY
R802,809	ERD18FJ2R2	2.2Ω, 1/8W, ±5%, Carbon	2	SAFETY
R210,213,260, 263,310,313, 360,363,410, 413,460,463 510,513,560,	ERO14CKF1652	16.5kΩ, 1/4W, ±1%, Metallic	15	

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
R563,610,613, 660,663,714, 722,764,772	ERO14CKF1652	16.5kΩ, 1/4W, ±1%, Metallic	9	○
R807	ERG2ANJ101	100Ω, 2W, ±5%, Metallic	1	
R218,268,318, 368,418,468, 518,568,618, 668	ERG2ANJ181	180Ω, 2W, ±5%, Metallic	10	

VARIABLE RESISTORS

VR1~12	EVAR15D20B54	50kΩ(B), Frequency Level Control	12	○
VR13	EWF8PA027B53	5kΩ(B), Master Level Control	1	○
VR101	EVLS3AA00B24	20kΩ(B), DC Unbalance Adjustment	1	
VR102	EVLS3AA00B54	50kΩ(B), Amplifier Gain Adjustment	1	
VR203,204, 253,254, 303,304, 353,354, 403,404, 453,454, 503,504, 553,554, 603,604, 653,654, 703,704, 753,754	EVLS3AA00B14	10kΩ(B), Each Frequency Gain Adj.	24	
VR201,251, 301,351, 401,451, 501,551, 601,651, 701,751	EVK5QA025C15	100kΩ(C), Center Frequency Control	12	○
VR202,252, 302,352, 402,452, 502,552, 602,652, 702,752	EVK6QA025A15	100kΩ(A), Band width Control	12	○

C103,114,121, 701,702,703, 751,752,753	ECCD1H100KC	10pF, 50WV, ±10%, Ceramic	9	
C117,604,607, 608,654,657, 658	ECCD1H220KC	22pF, 50WV, ±10%, Ceramic	7	
C757	ECCD1H270K	27pF, 50WV, ±10%, Ceramic	1	
C707	ECCD1H330K	33pF, 50WV, ±10%, Ceramic	1	
C106,112,120	ECCD1H330KC	33pF, 50WV, ±10%, Ceramic	3	
C601,603,605 606,609,651, 653,655,656, 659	ECCD1H560K	56pF, 50WV, ±10%, Ceramic	10	
C201,204,207, 251,254,257, 301,304,307, 351,354,357, 401,404,407, 451,454,457, 501,504,507, 551,554,557	ECCD1H820K	82pF, 50WV, ±10%, Ceramic	24	
C203,206,209, 253,256,259, 303,306,309, 353,356,359, 403,406,409, 453,456,459, 503,506,509, 553,556,559	ECCD1H151K	150pF, 50WV, ±10%, Ceramic	24	
C602,652	ECCD1H181K	180pF, 50WV, ±10%, Ceramic	2	
C202,205,208, 252,255,258, 302,305,308, 352,355,358, 402,405,408, 452,455,458, 502,505,508, 552,555,558,	ECCD1H271K	270pF, 50WV, ±10%, Ceramic	24	
C119	EXKD1H681KB	680pF, 50WV, ±10%, Ceramic	1	
C11,12	ECKD1H102PF	0.001μF, 50WV, $^{+100}_{-0}$%, Ceramic	2	
C809,812	ECKD1H103PF	0.01μF, 50WV, $^{+100}_{-0}$%, Ceramic	2	
C1,2	ECQE2A103MD	0.01μF, 250VAC, ±20%, Polyester	2	SAFETY
C610,613	ECQM05102JZ	0.001μF, 50WV, ± 5%, Polyester	2	
C461,462	ECQM05122JZ	0.0012μF, 50WV, ± 5%, Polyester	2	
C560,563	ECQM05222JZ	0.0022μF, 50WV, ± 5%, Polyester	2	
C361,362,510, 513	ECQM05472JZ	0.0047μF, 50WV, ± 5%, Polyester	4	
C261,262	ECQM05562JZ	0.0056μF, 50WV, ± 5%, Polyester	2	
C411,412,460, 463	ECQM05822JZ	0.0082μF, 50WV, ± 5%, Polyester	4	
C410,413	ECQM05103JZ	0.01μF, 50WV, ± 5%, Polyester	2	
C311,312	ECQM05223JZ	0.022μF, 50WV, ± 5%, Polyester	2	
C360,363	ECQM05333JZ	0.033μF, 50WV, ± 5%, Polyester	2	
C108,113	ECQM05473KZ	0.047μF, 50WV, ±10%, Polyester	2	
C3	ECQM1473M	0.047μF, 125WV, ±20%, Polyester	1	
C310,313	ECQM05563JZ	0.056μF, 50WV, ± 5%, Polyester	2	
C260,263	ECQM05154JZ	0.15μF, 50WV, ± 5%, Polyester	2	
C210,213	ECQM05474JZ	0.47μF, 50WV, ± 5%, Polyester	2	
C660,663	ECQS1121JZ	120pF, 125WV, ± 5%, Styrol	2	
C561,562,754, 755	ECQS1151JZ	150pF, 125WV, ± 5%, Styrol	4	
C611,612	ECQS1181JZ	180pF, 125WV, ± 5%, Styrol	2	
C704,705	ECQS1301JZ	300pF, 125WV, ± 5%, Styrol	2	
C661,662	ECQS1471JZ	470pF, 125WV, ± 5%, Styrol	2	
C104,110, 115,122	ECEA6V33L	33μF, 6.3WV, Electrolytic	4	
C811	ECEA6V1000L	1000μF, 6.3WV, Electrolytic	1	○
C813	ECEA10V1000	1000μF, 10WV, Electrolytic	1	
C105,111,116, 123,128,130, 131,132	ECEA16V47L	47μF, 16WV, Electrolytic	8	
C107,118,124, 134,214,264, 314,364,414, 464,514,564, 614,664,706, 756	ECEA16N10	10μF, 16WV, Non-Polar Electrolytic	16	SAFETY
C810	ECEA25V3R3L	3.3μF, 25WV, Electrolytic	1	
C101,102	ECSZ25EF4R7	4.7μF, 25WV, Electrolytic	2	
C215,216,315, 316,415,416, 515,516,615, 616	ECEA25V33L	33μF, 25WV, Electrolytic	10	
C803,804	ECEA25V220L	220μF, 25WV, Electrolytic	2	
C805,806	ECEA25V220V	220μF, 25WV, Electrolytic	2	
C807,808	ECEA25V330L	330μF, 25WV, Electrolytic	2	○
C801,802	ECEM35R103Y	10000μF, 35WV, Electrolytic	2	○

COMPONENT COMBINATIONS

Z801,802	RXAF103P22HD	0.01μF(×2), Ceramic, Hum Cancel	2	SAFETY

SWITCHES

S1	SSLA34S	Power Source Switch	1	SAFETY
S2	SSLA35S	Equalizer Selector Switch	1	
S3	SSRA8	Voltage Selector Switch	1	SAFETY

RELAYS

RELAY1	SSY7	Equalizer Selector Relay	1	○
RELAY2	SSEA14	Muting Relay	1	

LAMPS and FUSES

	XAMR38S150A	Power & Equalizer Indicator Lamp. (6.3V 40mA)	2	SAFETY
F1	XBA2K08NS5	800mA Fuse	1	SAFETY

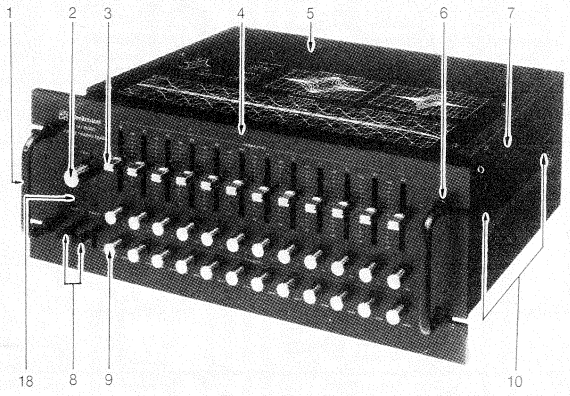
CABINET and CHASSIS PARTS

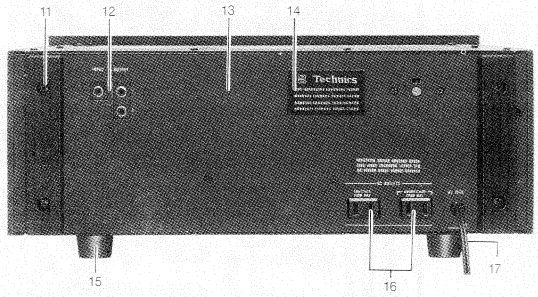
1	SKYA4	Handle, Front Panel	2	
2	SBNA129	Knob, Master Level Control	1	○
3	SBD1	Knob, Frequency Level Control	12	○
4	SGW6411	Front Panel	1	○
5	SKPA7-1	Top Board, Chassis	1	○
6	SGXA64	Bracket, Hande	4	
7	SKSA2	Side Cover, Chassis	2	
8	SBLA4-1	Knob, Power & Equalizer Switch	2	
9	SBNA130	Knob, Bandwidth & Center Frequency Control	24	
10	XVE4B8K	Bolt, Front Panel & Side Cover M'tg.	10	
11	SHGA302-1	Rubber Cushion, Rear Panel	2	
12	SJF3305	Terminal, Input & Output	1	○

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
13	SGP30-1AX	Rear Panel, with Name Plate	1	○
14	SGT11670	Name Plate	1	○
	SHR567	Cover Paper, (AC 60 Hz 120V) Indicate	1	○
15	SHGA303-1	Leg, Set Bottom Board	4	
	SKUA370	Bottom Board	1	
16	SJSA66-1	Socket, AC Outlet	2	SAFETY
17	**RJA5C**	AC Cord	1	SAFETY
	RHR111	Bushing, AC Cord	1	
	SJSA150 1A	Connector Lead Wire (with 6 pin)	6	○
	SJT341	6 pin Connection Terminal	12	○
	SHRA2	Spacer, Printed Circuit Board M'tg.	6	
	XTV3+8CR	Red Screw, Bottom Board M'tg.	10	
	XTB3+8BK	Black Screw, Top Board M'tg.	11	
	SMP235	Lamp M'tg.	1	○
	SHGA204	Rubber Bracket, Lamp	2	
18	SGLA9	Orange Filter, Panel Light	2	

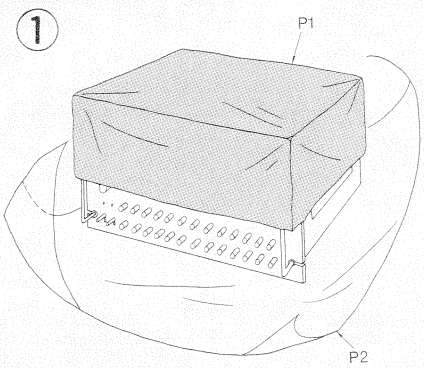
Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
		ACCESSORIES		
	SJP2101	Connection Cord	2	○
	RJP16AS	AC Plug	1	
	RJP17AS	AC Plug	1	
		PACKING PARTS		
P1	SPPA27	Soft Cover	1	
	SPEA3	Cover, AC Plug	1	
P2	SPHA6008	Polyethylene Sheet	1	
P3	SPSA94	Pad, Upper	1	
P4	SPSA135	Pad, Lower	1	
P5	SPG563	Carton Box, Outer	1	○
P6	SQF1121	Printed Matter, Complete	1	○
P7	SPN5117	Carton Box, Inner	1	○
P8	SPSA30	Pad Board, Carton Box	1	

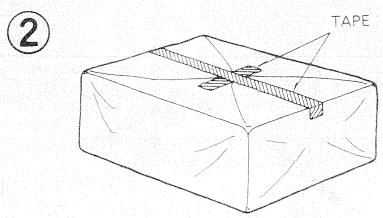
■ CABINET PARTS

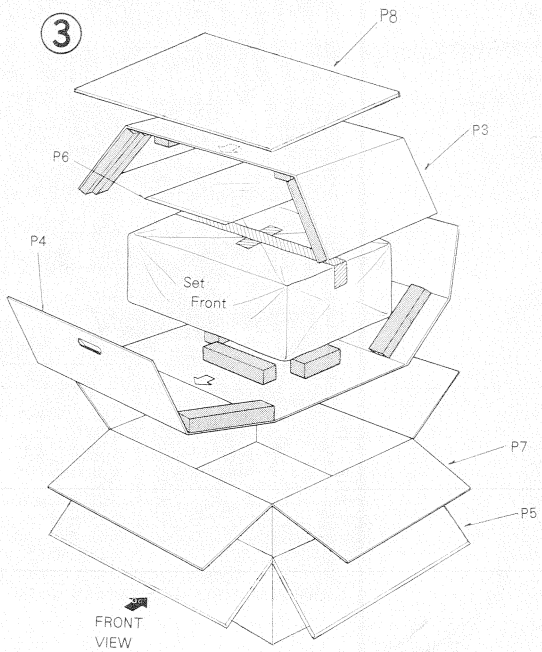




■ PACKINGS







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